

**Galer, Rose**

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**From:** Rose, Jay  
**Sent:** Thursday, February 28, 2008 5:22 PM  
**To:** Galer, Rose  
**Subject:** FW: Fw: Cs/Sr long-term storage at recycling center  
**Follow Up Flag:** Follow up  
**Flag Status:** Red

WSRC 2008

Email from Rick Geddes, WSRC, to Jay Rose, Tetra Tech "Cs/Sr Long-term Storage at Recycling Center", Tetra Tech, February 25, 2008.

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**From:** rick.geddes@srs.gov [mailto:rick.geddes@srs.gov]  
**Sent:** Friday, February 22, 2008 1:57 PM  
**To:** Buschman, Nancy  
**Cc:** robert05.jones@srs.gov; steven.mcconnell@srs.gov  
**Subject:** Re: Fw: Cs/Sr long-term storage at recycling center

Let me try to give you some answers:

**1. Need an estimate of how much storage space (square footage) would be needed to store 1,410 MT Cs/Sr waste.**

Ans: We don't know if this is pure Cs/Sr (net) or some gross tonnage of a particular waste form. Let me just give you the information you can use to calculate a number.

Our 800 MT/yr plant processing 60GWD/5 yr cooled fuel recovers about 5 MT/yr of Cs + Sr. Depending on waste form and package size, this 5 MT would likely result in 100 - 300 canisters. Our storage concept is a forced air cooled building similar to an SRS glass-waste storage building. The SRS buildings hold about 2000 canisters and have a footprint of about 40,000 sq. ft.

**2. Need an estimate of the annual number of workers who would be "caretakers" for this storage once the recycling center mission changes from recycling to Cs/Sr storage**

Ans: The original EAS estimated the permanent staff for surveillance and maintenance of the Cs/Sr waste resulting from processing 120,000 MT of fuel (3000 MT/yr, 40 yrs) at 385 people. This assumed it was a freestanding operation, not for instance, located on a DOE site which could supply substantial supporting capability. This number could be adjusted somewhat depending on the amount of Cs/Sr to be stored but is probably relatively inelastic.

**3. Need an estimate of the annual average dose (mrem/yr) to the average "caretaker".**

Ans: Likely very small. Typical assumptions might be that only about 1/2 of the staff (~ 200 people) are "rad workers". They might average 100 mrem/yr with a maximum individual exposure of 500 mrem.

One other item I would like to comment on. In this email string I see the statements that:

*The recycling center might need to store a variety of radiological materials pending ultimate disposition. For example, the facility might store Cs-137 and Sr-90 for up to 300 years. Additionally, if fast reactors are delayed, it might be necessary to store the TRU that is separated from LWR SNF, or the MOX SNF from the Thermal/Fast Recycle Alternative discussed in Section 4.4.*

*As discussed below, the impacts of storing TRU (or MOX SNF) would not be expected to be significantly different from the storage of LWR SNF (which is described in Section 4.2.1.1)*

We strongly disagree with the conclusion that storing TRU would not be significantly different from storing SNF. We expect that the safety basis for long-term TRU storage will require an active surveillance and maintenance program, probably including destructive analysis of a statistically based number of samples, therefore hot cell operations will be required. Also an active infrastructure to support all the requirements of a plutonium/TRU operation will be needed. Repackaging will require calcining, automatic packaging machines, leak testing, and robotic transfers back to the vault. Also keep in mind that TRU storage will place the facility in an entirely different security mode than SNF storage.

Steven McConnell/WSRC/Srs

To Rick Geddes/WSRC/Srs@Srs, Robert05 Jones/WSRC/Srs@Srs

cc

02/22/2008 12:14 PM

Subject Fw: Cs/Sr long-term storage at recycling center

Please evaluate - I would think that this information is readily available - or derived from the work that we have done.

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Steve McConnell  
803-725-6025 voice  
877-659-2501 pager  
803-725-8136 fax

----- Forwarded by Steven McConnell/WSRC/Srs on 02/22/2008 12:13 PM -----

"Buschman, Nancy"  
<Nancy.Buschman@Nuclear.Energy.gov>

To steven.mcconnell@srs.gov

cc "Stout, Daniel" <Daniel.Stout@Nuclear.Energy.gov>

02/22/2008 11:32 AM

Subject Fw: Cs/Sr long-term storage at recycling center

Hi Steve

We've had a lot of discussions on the PeIS this week. Would someone on your team be available to answer the questions below? When might the information be available?

3/5/2008

Thanks  
Nancy

----- Original Message -----

From: Rose, Jay <Jay.Rose@tetrattech.com>

To: Buschman, Nancy

Cc: Itani, Maher <Maher.Itani@tetrattech.com>; Human, Wayne <Wayne.Human@tetrattech.com>; Schwartz, Francis (NE-HQ)

Sent: Fri Feb 22 05:58:09 2008

Subject: Cs/Sr long-term storage at recycling center

Hi Nancy-as we discussed yesterday afternoon, here's the info related to the Cs/Sr storage at the recycling center. We will need to assess storage over 300 years:

Based on my info from Roald (Table 4.8-1), over 2010-2060, the recycling center would generate approximately 1,410 Metric Tons of Cs/Sr wastes.

We will need to assess the impacts of storing this much material.  
Here's what we will need to do that:

1. Need an estimate of how much storage space (square footage) would be needed to store 1,410 MT
2. Need an estimate of the annual number of workers who would be "caretakers" for this storage once the recycling center mission changes from recycling to Cs/Sr storage
3. Need an estimate of the annual average dose (mrem/yr) to the average "caretaker"

Please note that if this information cannot be developed by WSRC or NE, then I should be able to develop reasonable info for items 2 and 3 based on the assumption that Cs/Sr storage would be bounded by SNF long-term storage... what I am not sure about is item 1. So, that is most important. If possible, can you put together a short (couple sentence) description of how the Cs/Sr would be stored (i.e., in cans? How much material per can?). This info may already exist from previous studies, I just don't have it.

Thx-j

As a point of reference I have attached some of the relevant info for TRU storage that is currently in the PEIS (Section 4.3.3):

The recycling center might need to store a variety of radiological

3/5/2008

materials pending ultimate disposition. For example, the facility might store Cs-137 and Sr-90 for up to 300 years. Additionally, if fast reactors are delayed, it might be necessary to store the TRU that is separated from LWR SNF, or the MOX SNF from the Thermal/Fast Recycle Alternative discussed in Section 4.4.

As discussed below, the impacts of storing TRU (or MOX SNF) would not be expected to be significantly different from the storage of LWR SNF (which is described in Section 4.2.1.1). Although TRU or MOX SNF storage at the scale that might be needed is beyond current (or past) practice, experience with other radioactive material storage provides a useful basis for planning. The technical challenge includes simultaneously coping with heat output, radiation emissions, criticality limits and security requirements. TRU would be managed with the following considerations:

- Quantities per package must be limited for criticality and decay heat limits. Limits are likely to be in the kg/package range.
- This material would require secure and monitored storage.
- The TRU product can be stored in a metal form, loose oxide, or pressed oxide.
- A custom storage facility would be needed, probably inside the separations plant of the fuel fabrication plant.
- There should not be any technical show-stoppers (Halsey 2007).

To support a 3,000 MTHM/year separation process, approximately 352,739 lbs/yr (160,000 kg/yr) of TRU Oxide would be produced.[1] This material could be stored in approximately 11,000 cans (assuming approximately 37.5 lbs/can [14 kg/can]). To support ten years of storage, a facility capacity of approximately one million square feet would be required (Bayer 2007).

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[1] Data is presented for 3,000 MTHM recycling center. If a smaller or larger recycling center were constructed and operated, quantities would be expected to scale linearly. For example, to estimate impacts for storing materials from a 3,400 MTHM recycling center, quantities would be multiplied by 1.13 (3,400/3,000).